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Origin

President and Fellows of Harvard University entered into Contract N5ori-07669 with the Office of Naval Research, Department of the Navy as of January 1, 1955. The original agreement supported continuation of Tiedeman's interests in applying multivariate statistical methods to the study of career development. Two specific tasks were completed in satisfaction of this original agreement. One task was to investigate the consistency with which school counselors used scores of differential aptitudes in allocating pupils to high school curricula. The other task was to assay the influence of students' migrations among college majors on the basis of multivariate distributions of their scores at entry into college. This latter study was replicated in order to test for consistency in results.

Continuation and Termination

Contract N5ori-07669 was replaced on December 1, 1956, by Contract Nonr-1866(31) and was further renewed from time to time until December 31, 1962, when technical developments were terminated as agreed.

Tasks Undertaken

The following tasks were undertaken in fulfillment of the agreement:

- Task 1 A logical analysis of the problem of educational and occupational ability patterns.
- Task 2 Test of hypothesis that antecedent multivariate test-score distributions become more homogeneous as people migrate from educational or occupational groups.
- Task 3 Test of hypothesis that educational and occupational ability patterns are consistently expected by persons responsible for guiding the educational and occupational differentiation of people.
- Task 4 Logical analyses of the problem of predicting educational and occupational choices.

- Task 5 Study of the relationship between identity and level of occupational aspiration.
- Task 6 Study of the time when each of several conceptions of vocational relevance begin to enter into adolescents' evaluations of themselves.
- Task 7 Study of development in the fidelity of an adolescent's awareness of attributes of vocational relevance.
- Task 8 Relating self conceptions and role perceptions to continuation in nursing school
- Task 9 Relating conceptions of self inferred from an autobiography to the field of concentration in college.
- Task 10 Family atmosphere during childhood in relation to career.
- Task 11 Study of the marriage-career interaction among women between the ages of 13-25.
- Task 12 Relating parental expectancies and task involvement to continuation in a sequence of physics courses in college.
- Task 13 Vocational development and the election of a secondary school curriculum.
- Task 14 Consistency of self conceptions in relation to achievement in high school.
- Task 15 Ascertaining the relative importance of information and support on students' aspirations for higher education.
- Task 16 A logical analysis of self-concept and its relation to career development.
- Task 17 Relating achievement independent of scholastic aptitude to self conceptions reported by high school boys.
- Task 18 Relating the quality of projection to ink blots to that of projection to vocational choice.

Technical Reports

The following Technical Reports have been delivered and are still supplied upon request unless they are now in the general literature:

1. Tiedeman, David V. and O'Hara, Robert P. "Preparedness and Occupational Choice." A modified version of this report which was entitled "Preparedness and the Freedom to Choose One's Occupation" was published in: Gruber, Frederick C. (Editor) The Good Education of Youth. Philadelphia: University of Pennsylvania Press, 1957. pp. 229-248. (This report is related to Tasks 1 and 4).
2. Tatsuoka, Maurice M. Joint Probability of Membership and success in a Group: An Index which Combines the Information from Discriminant and Regression Analyses as Applied to the Guidance Problem. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, 1957. (Mimeo) (This report was completed as a part of Task 4 but is also relevant to Task 1)
3. O'Hara, Robert P. and Tiedeman, David V. "Vocational Self Concept in Adolescence", Journal of Counseling Psychology, 6, 292-301(1959). (This report is related to Task 7).
4. Tiedeman, David V.; and Pandit, Jiwan Lal. On Identity and Level of Occupational Aspiration. Cambridge, Mass.; The senior author, 13 Kirkland Street, 1958. (Mimeo) (This is a report of Task 5)
5. Tiedeman, David V.; O'Hara, Robert P.; and Matthews, Esther. Position Choices and Careers: Elements of a Theory. Cambridge, Mass.: The senior author, 17 Sumner Road, 1958. (Mimeo) (This report is related to Task 7.)
6. Hagen, Douglas. "Careers and Family Atmospheres: An Empirical Test of Roe's Theory", Journal of Counseling Psychology, 7, 251-256 (1960). (This report is related to Task 10).
7. Kugris, Violet; and Tiedeman, David V. "You Ought to Study...": Method and Results in Relation to the Election of a Curriculum in Secondary School. Cambridge, Mass.: The junior author, 17 Sumner Road, 1959. (Mimeo). Under revision. (This is a report of Task 3.)

8. Kibrick, Anne K.; and Tiedeman, David V. "Conceptions of Self and Perception of Role in Schools of Nursing", Journal of Counseling Psychology, 8, 62-69 (1961) (This is a report of Task 8.)
9. Cass, John C.; and Tiedeman, David V. "Vocational Development and the Election of a High School Curriculum", Personnel and Guidance Journal, 38, 538-545 (1960) (This is a report of Task 13).
10. O'Hara, Robert P. Talk about Self: The Results of a Pilot Series of Interviews in Relation to Ginzberg's Theory of Occupational Choice. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, 1959. (Mimeo) (This is a report of Task 6)
11. Tiedeman, David V. "Decision and Vocational Development: A Paradigm and Its Implications", Personnel and Guidance Journal, 40, 15-21 (1961). (This report is relevant to Task 4.)
12. Tiedeman, David V.; and O'Hara, Robert P. The Harvard Studies in Career Development: In Retrospect and Prospect, Cambridge, Mass.: The senior author, 17 Sumner Road, 1960. (Mimeo) (This report is related to Task 4.)
13. Herriott, Robert E. "Some Social Determinants of Educational Aspiration", Harvard Educational Review, 33, 157-177 (1963). (This is a report of Task 15.)
14. O'Hara, Robert P. "Awareness of Interests of Boys in Grades Seven and Eight". Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, Sept. 1961. (Typewritten) (This is a report of additional work completed under Task 7.)
15. Matthews, Esther; and Tiedeman, David V. The Imprinting of Attitudes towards Career and Marriage upon the Life Styles of Young Women. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, Sept. 1961. (Typewritten) (This is a report of Task 11.)
16. Cole, Joseph, W.; Wilson, Kenneth M.; and Tiedeman David V. Dispersion Analysis and the Search for Educational Goals in College: A study in Duplicate. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Rd., Oct. 1961. (Typewritten) (This is a report of Task 2.)

17. Congdon, Robert G. Similarity to Parents, Reality Orientation, and Interpersonal Behavior as Factors in Vocational Maldevelopment. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, Oct. 1961. (Typewritten) (This is a report of Task 12)
18. Walston, Ernest, B. The Autobiography in the Prediction of College Field of Concentration. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, Dec. 1961. (Mimeo) (This is a report of Task 9).
19. O'Hara, Robert P. Vocational Self Concepts and High School Achievement. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, February 1962. (Mimeo) (This is a report of Task 17.)
20. Tiedeman, David V.; and O'Hara, Robert P. Differentiation and Integration in Career Development. Cambridge, Mass.: The senior author, 17 Sumner Road, Feb. 1962. (This is a continuation of work on Task 4.)
21. Field, Frank L.; Kehas, Chris D. and Tiedeman, David V.: The Self Concept in Career Development: A Construct in Transition. Cambridge, Mass.: The junior author, 17 Sumner Road, Mar. 1962. (Mimeo). To be published in Personnel and Guidance Journal, May 1963. (This report is related to Task 16.)
22. Kehas, Chris, D. A Critical Analysis of Attempts to Denote Self-Concept. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Rd., April 1962. (Mimeo.) (This report is related to Task 16.)
- 22.*Field, Frank L. Self as Process: A Revision of Vocational Theory Directed Toward the Study of Individual Development in the Vocational Situation. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, May 1962 (Mimeo) (This report is related to Task 16.)

* Unfortunately, two reports were numbered as 22.

Developments in theory

I have repeatedly reported consolidations of the findings emerging both from the studies supported by this and other grants of mine and from relevant studies of other investigators at Harvard and elsewhere. These efforts are on file with ONR in Technical Reports on Tasks 1-17 (except for Task 14) as identified above.

Data on Task 14 were analyzed but not reported. Computations will be made available upon demand of interested professionals. A report is being drafted by Robert O'Hara.

Task 18 is still being developed. The results will probably be available at a later time at least in a dissertation on file in Widener Library.

My efforts at consolidation have sought clarification of a linguistic frame within which a more comprehensive theory of career development can be formulated. Since my entry into the study of career development was through method, my linguistic frame for career development has been clarified most by realizing that method must be the servant of idea rather than the reverse. My present theory of career development simply incorporates this realization into the model out of which a career is fashioned.

My work on career development as this realization about agency was being understood can be characterized in terms of three modes of thought:

- 1) statistical method;
- 2) application of method; and
- 3) harmonization of method and use through clarification of a psycho-social theory of career development with the formation of an identity as the central issue (Tiedeman and O'Hara, TR 12, 1960). The work at Harvard is referred to these three categories in Attachment A. The work specifically supported by Contracts N5ori-O7669 and Nonr-1866(31) is denoted by an asterisk(*).

Field, Kehas, and I (T.R. 21, 1961) are presently trying to provide empiric support for later ideas we have concerning needed revisions in the

forming psycho-social theory of career development. Kehas is investigating the denotation of self-concept. Field is investigating the appearance of mechanisms likely to trigger action as resident in both projective and vocational data.

Disclosure

Technical reports have been delivered as tasks were completed. All tasks are now complete except for Tasks 14 and 18 as noted above. Technical Reports have been modified and published in the general literature as rapidly as possible. The final work of Field and Kehas which was initiated with support under terms of this Contract will probably soon be available in Widener Library. I shall assume responsibility for seeing that wider disclosure is considered by Kehas and Field. I do not anticipate difficulty because both have entered university careers.

Subsidization of Students

During the course of this agreement, funds from this Contract enabled the completion of doctoral work as follows:

Student awarded Ed.D. in	Number
1956	0
1957	2
1958	2
1959	4
1960	2
1961	1
1962	0
Total	11

Attachment A

A Classification of Work in Career Development Completed at the Harvard Graduate School of Education Since 1950 is Reported in the Following Categories:

- I. Method - multivariate analysis, particularly multiple discriminant analysis.
- II. Application of method
 - A. Secondary school curriculum choice
 - B. College major choice
 - C. Prediction of occupation
 - D. Summary of method and application
- III. Clarification of theory in career development
 - A. Self concept, identity, and career
 - B. A psycho-social theory of career
 - 1. Education
 - 2. Family
 - 3. Reciprocity
 - C. Continuity of choice
 - D. Models

Each work in the classification is cited fully when first noted. If a work is also relevant to a later category, it is merely noted in the later category by author if possible and also by date when necessary. Citations are arranged alphabetically within a category. Studies supported by funds from Contracts N5ori-07669 and Nonr-1866(31) are preceded by an asterisk(*).

I. METHOD - MULTIVARIATE ANALYSIS, PARTICULARLY MULTIPLE DISCRIMINANT ANALYSIS

Bryan, Joseph G. A Method for the Exact Determination of the Characteristic Equation and Latent Vectors of a Matrix with Applications to the Discriminant Function for More Than Two Groups. Cambridge, Mass.: Harvard Graduate School of Education, 1950. (Unpublished doctoral dissertation).

- * Cass, John C. and Tiedeman, David V. "Vocational Development and the Election of a High School Curriculum". Personnel and Guidance Journal, 1960, 38, 538-545.
- Dunn, Frances E. "Two Methods of Predicting the Selection of a College Major", Journal of Counseling Psychology, 1959, 6, 16-26.
- Cooley, William and Lohnes, Paul. Multivariate Procedures for the Behavioral Sciences. New York: John Wiley and Sons, 1962.
- Franch, Wendell L. "Can a Man's Occupation be Predicted?", Journal of Counseling Psychology, 1959, 6, 95-99.
- Hung, Samuel. On the Sampling Distribution of the Second of Three Non-trivial Routes of a Certain Product Matrix. Cambridge, Mass.: Harvard Graduate School of Education, 1962. (Unpublished doctoral dissertation).
- King, Richard G. The Prediction of Undergraduate Field of Concentration in Harvard College. Cambridge, Mass.: The author, Harvard College, 1958. (Published doctoral dissertation).
- Knapp, Thomas R. Two-Group Classification in the Absence of a Criterion. Cambridge, Mass., Harvard Graduate School of Education, 1960. (Unpublished doctoral dissertation).
- Lohnes, Paul R. A Comparison of Test Space and Discriminant Space Classification. Cambridge, Mass., Harvard Graduate School of Education, 1960. (Unpublished doctoral dissertation).
- Rulon, Phillip J.; Tiedeman, David V.; Langmuir, Charles R.; and Tatsuoaka, Maurice M. The Profile Problem: A Methodological Study of the Interpretation of Multiple Test Scores. Cambridge, Mass.: Educational Research Corp., 10 Craigie Street, 1954.

Schweiker, Robert. Individual Space Models of Certain Statistics. Cambridge, Mass., Harvard Graduate School of Education, 1954. (Unpublished doctoral dissertation).

- * Tatsuoaka, Maurice M. Joint-Probability of Membership and Success in a Group: An Index which Combines the Information from Discriminant and Regression Analyses as Applied to the Guidance Problem. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road. 1957 (Mimeo).

Tiedeman, David V. "On the Study of Types" Symposium on Pattern Analyses. Air University, USAF School of Aviation Medicine, Randolph Field, Texas, May, 1955.

Tiedeman, David V.; and Bryan, Joseph G. "Prediction of College Field of Concentration", Harvard Educational Review, 1954, 24, 122-139.

Tiedeman, David V.; Rulon, Phillip J. and Bryan, Joseph G. The Utility of the Airman Classification Battery for Assignment of Airmen to Eight Air Force Specialities. Cambridge, Mass.: Educational Research Corp., 10 Craigie St., 1951.

Tiedeman, David V. and Sternberg, Jack J. "Information Appropriate for Curriculum Guidance", Harvard Educational Review, 1952, 22, 257-274.

II. APPLICATION OF METHOD

A. Secondary School Curriculum Choice

- * Cass, and Tiedeman, op. cit.
- * Kugris, Violet; and Tiedeman, David V. "You Ought to Study...": Method and Results in Relation to the Election of a Curriculum in Secondary School. Cambridge, Mass.: The junior author, 17 Sumner Road, 1959 (Mimeo)

Tiedeman and Sternberg, op. cit.

B. College Major Choice

Cole, Joseph W. The Effect of Migration on the Multivariate Test Score Distribution Patterns for College Students Classified According to Curriculum Groups. Cambridge, Mass.: Harvard Graduate School of Education, 1958. (Unpublished doctoral dissertation).

Dunn, op. cit.

French, op. cit.

King, op. cit.

* Tatsuoka, op. cit.

Tiedeman and Bryan, op. cit.

* Walston, Ernest B. The Autobiography in the Prediction of College Field of Concentration. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, 1961, (Mimeo)

* Wilson, Kenneth M. The Effect of Changes in Fields of Study on the Dispersion of Antecedent Multivariate Test Distributions for College Field of Concentration Groups. Cambridge, Mass.: Harvard Graduate School of Education, 1959. (Unpublished doctoral dissertation).

* Cole, Joseph W.; Wilson, Kenneth M.; and Tiedeman, David V.: Dispersion Analysis and the Search for Educational Goals in College: A Study in Duplicate. Cambridge, Mass.: The junior author, 17 Sumner Road, 1962 (Mimeo). (Being revised for

publication in Journal of Educational Psychology).

C. Prediction of Occupation

French, op. cit.

- * Hagen, Douglas,: "Careers and Family Atmospheres: "An Emperical Test of Roe's Theory", Journal of Counseling Psychology, 1960, 7, 251-256.

Tiedeman, Rulon, and Bryan, op. cit.

D. Summary of Method and Application

Cooley, William, An Application of a Developmental Rationale and Methods of Motivational Analysis to the Study of Potertial Scientists. Cambridge, Mass.: Harvard Graduate School of Education, 1958. (Unpublished doctoral dissertation)

- * Tiedeman, David V.; and O'Hara, Robert P. "Preparedness and the Freedom to Choose One's Occupation." In Gruber, Frederick C. Ed. The Good Education of Youth. Philadelphia, Penna.: University of Pennsylvania Press, 1957, Pp. 229-248.

III. CLARIFICATION OF THEORY IN CAREER DEVELOPMENT

A. Self Concept, Identity and Career

- * Cass, op. cit.

Dunn, op. cit.

- * Field, Frank L. Self as Process: A Revision of Vocational

Theory Directed Toward the Study of Individual Development in the Vocational Situation, Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, 1962 (Mimeo)

- * Field, Frank L.; Kehas, Chris D.; and Tiedeman, David V. The Self Concept in Career Development: A Construct in Transition, Cambridge, Mass.: The junior author, 17 Sumner Rd., 1962. (Mimeo).
 - * Kehas, Chris D. A Critical Analysis of Attempts to Denote Self-Concept. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Rd., 1962 (Mimeo).
 - * Kugris and Tiedeman, op. cit.
 - * Matthews, Esther. The Marriage-Career Conflict in the Career Development of Girls and Young Women. Cambridge, Mass.: Harvard Graduate School of Education, 1960. (Unpublished doctoral dissertation.)
 - * Matthews, Esther; and Tiedeman, David V.: The Imprinting of Attitudes towards Career and Marriage upon the Life Styles of Young Women. Cambridge, Mass.: The junior author, 17 Sumner Rd., 1962 (Mimeo) (Submitted for publication in Journal of Counseling Psychology.)
- Mulvey, Mary. Psychological and Sociological Factors in the Prediction of Career Patterns of Women. Cambridge, Mass.: Harvard Graduate School of Education, 1961. (Unpublished doctoral dissertation).

- * O'Hara, Robert P. On the Importance of the Self Concept to a General Theory of Occupational Choice. Cambridge, Mass.: Harvard Graduate School of Education, 1957. (Unpublished Special Paper.)
- * O'Hara, Robert P. Talk about self: The Results of a Pilot Series of Interviews in Relation to Ginzberg's Theory of Occupational Choice. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Road, 1959. (Mimeo).
- * O'Hara, Robert P. Awareness of Interest in Boys in Grades Seven and Eight. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Rd., 1962 (Mimeo).
- * O'Hara, Robert P.; and Tiedeman, David V. "Vocational Self Concept in Adolescence." Journal of Counseling Psychology 1959, 6, 292-301.
- * Tiedeman, David V.; and O'Hara, Robert P. Differentiation and Integration in Career Development. Cambridge, Mass.: The senior author, 17 Sumner Road, 1962 (Mimeo)
- * Walston, op. cit.

B. Psycho-social Theory of Career

1. Education

Coffee, James M. Occupational Realism: An Analysis of Factors Influencing Realism in the Occupational Planning of Male High School Seniors. Cambridge, Mass.: Harvard Graduate School of Education, 1957. (Unpublished doctoral dissertation).

Gribbons, Warren D. Determination of Progress in Educational and Vocational Planning in Adolescence. Cambridge, Mass.: Harvard Graduate School of Education, 1957. (Unpublished doctoral dissertation).

Katz, Martin. The Development and Evaluation of a Guidance Text for Eighth or Ninth Grade. Cambridge, Mass.: Harvard Graduate School of Education, 1959. (Unpublished doctoral dissertation).

Lee, Eugene. Career Development of Science Teachers: Personality Determinants at the Exploratory Stage. Cambridge, Mass.: Harvard Graduate School of Education, 1961. (Unpublished doctoral dissertation).

* O'Hara, Robert P. Vocational Self Concepts and High School Achievement. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Rd., 1962 (Mimeo).

* O'Hara and Tiedeman, op. cit.

Tiedeman, David V. "Occupational Choice: An Approach to a General Theory: A Review", Harvard Educational Review, 1952, 22, 184-190.

Tiedeman, David V.; Field, Frank L. "Guidance: The Science of Purposeful Action Applied through Education", Harvard Educational Review, 1962, 32, 483-501.

2. Family

* Cass and Tiedeman, op. cit.

Coffee, op. cit.

- * Congdon, Robert. Three Personality Elements in the Capacity of Technology Freshmen to Meet Curriculum Demands. Cambridge, Mass.: D.V. Tiedeman, 17 Sumner Rd., 1961 (Mimeo) (Being revised for publication in Personnel and Guidance Journal)

- * Hagen, op. cit.

Ramsey, Robert R., Jr. A Study of Cultural Influence on Academic Performance in College and Law School. Cambridge, Mass.: Harvard Graduate School of Education, 1959. (Unpublished doctoral dissertation).

Roe, Anne; and Siegelman, Marvin. A Study of the Origin of Interests (in press)

3 Reciprocity

- * Herriott, Robert E. "Some Social Determinants of Educational Aspiration", Harvard Educational Review, 1963, 33, 157-177.

Massimo, Joseph L. Counseling, Remedial Education and Employment: An Avaluation of a Comprehensive Treatment Approach to Delinquency in Adolescent Boys. Cambridge, Mass.: 1962. (Unpublished doctoral dissertation).

- * Tiedeman, David V.; and Pandit, Jiwan Lal. On Identity and Level of Occupational Aspiration. Cambridge, Mass.: The senior author, 17 Sumner Road, 1958 (Mimeo)

C. Perseveration of Choice

- * Cole, Wilson, and Tiedeman, op. cit.

- * Congdon, op. cit.
 - * Kibrick, Anne K. and Tiedeman, David V. "Conceptions of Self and Perception of Role in Schools of Nursing", Journal of Counseling Psychology, 1961, 8, 62-69.
 - * Walston, op. cit.
- Mierzwa, John. The Differentiation of Career Choice: A Study of the Choice of a Career in Science during a Two-Year Period in Late Adolescence. Cambridge, Mass.: Harvard Graduate School of Education, 1961. (Unpublished doctoral dissertation)

D. Models

- * I. Herriott, op. cit.
- * Tatsuoka, op. cit.
- * II. Tiedeman, David V. "Decision and Vocational Development: A Paradigm and Its Implications", Personnel and Guidance Journal. 1961, 40, 15-21.
- * Tiedeman, and O'Hara, op. cit.
- III. Field, op. cit.
- * Field, Tiedeman and Kehas, op. cit.
- * Kehas, op. cit.
- Tiedeman and Field, op. cit.